

When a circuit board is inserted in an enclosure, static from the technician may be discharged onto the circuit board. It is important that this static be discharged from the circuit board prior to the connectors of the circuit board making contact with the pins of the backplane. Otherwise, the static will travel through the backplane pins toward electronic components connected to those pins and may damage those components.

In electronics systems, many devices and techniques have been developed to provide electrostatic discharge (ESD) protection and to provide electromagnetic containment (EMC) or electromagnetic interference (EMI) shielding. These devices and techniques include those disclosed in the following references, each of which is incorporated by reference in its entirety herein:

- all checked JAF
- U.S. Patent No. 3,835,438, issued September 10, 1974 to Longworth, Jr., entitled "Self-Grounding Clip For The Mounting Strap Of An Electric Switch Or Receptacle";
 - U.S. Patent No. 4,781,603, issued November 1, 1988 to Olsson et al., entitled "Grounding System For A Cabinet";
 - U.S. Patent No. 5,196,712, issued March 23, 1993 to Nguyen et al., entitled "Printed Circuit Board Apparatus With Optical Switching";
 - U.S. Patent No. 5,311,408, issued May 10, 1994 to Ferchau et al., entitled "Electronic Assembly With Improved Grounding And EMI Shielding";

- U.S. Patent No. 5,478,253, issued December 26, 1995 to Biechler et al., entitled "Electrostatic Discharge Contacts For Blind Mating Connectors";
- U.S. Patent No. 5,537,294, issued July 16, 1996 to Siwinski, entitled "Printed Circuit Card Having A Contact Clip For Grounding A Printed Circuit Board Found Therein";
- U.S. Patent No. 5,867,366, issued February 2, 1999 to Klein et al., entitled "Electronic Module And Plastic Substrate To Accept And Hold The Electronic Module";
- 10 • U.S. Patent No. 5,916,652, issued June 29, 1999 to Miner et al., entitled "Liner For Adhesive-Backed Sheet Material";
- U.S. Patent No. 5,934,916, issued August 10, 1999 to Latal et al., entitled "Printed Circuit Board Mounting Rail Member And Ground Clip Assembly";
- 15 • U.S. Patent No. 5,973,926, issued October 26, 1999 to Sacherman et al., entitled "Method And Apparatus For Attaching Circuit Board To Chassis And Forming Solid Ground Connection Using A Single Crew";
- U.S. Patent No. 6,080,930, issued June 27, 2000 to Lommen et al., entitled "ESD/EMC Gasket";
- 20 • U.S. Patent No. 6,159,024, issued December 12, 2000 to Munch et al., entitled "Device For Creating An Electrically Conducting Connection For An Assembly Panel Fitted In A Switch Cabinet";

⁵
all checked
on this page
JJP

all
checked
JMS

5

10

- U.S. Patent No. 6,201,710, issued March 13, 2001 to Bagung et al., entitled "Housing Configuration For A Printed Circuit Board Equipped With Components";
- U.S. Patent No. 6,254,402, issued July 3, 2001 to Barnes, Jr. et al., entitled "Push Pin Ground";
- U.S. Patent No. 6,276,947, issued August 21, 2001 to Homfeldt et al., entitled "U-Crimp";
- U.S. Patent No. 6,282,101, issued August 28, 2001 to Hanas et al., entitled "EMI/ESD Shielding Assembly For An Electronic System";
- U.S. Patent No. 6,301,124, issued October 9, 2001 to Nikazm et al., entitled "Computer Chassis Identification Method"; and
- U.S. Patent No. 6,483,023, issued November 19, 2002 to Jacques, entitled "Fabric Wrapped Over Spring EMI Gasket".

15

20

Referring first to Fig. 6, which is a prior art representation of a portion of a printed circuit board 10 being inserted into a conventional enclosure 11. The circuit board 10 may conventionally include ground pins 12 beneath the printed circuit board which fit into receptacles 13 formed through a bottom bracket 16 across the front face of the enclosure. Typically, the bottom receptacles are circular openings sized so that the ground pin 12 at the bottom of the printed circuit board engages the sides of the receptacles 13 prior to the circuit board connectors engaging the backplane pins so that any charge on the circuit boards passes from the pins to the brackets as a result